

Highlights

U.S. Technology in the Marketplace

- ◆ **The United States continues to be the leading producer of high-technology products, responsible for about one-third of the world's production.** Although the margin of U.S. leadership narrowed during the 1980s when Japan rapidly enhanced its stature in high-technology fields, by 1998 U.S. high-technology industries had regained some of the world market share lost during the previous decade.
- ◆ **The market competitiveness of individual U.S. high-technology industries varies, although each maintained strong, market positions over the 19-year period examined.** Three of the four science-based industries that form the high-technology group (computers and office machinery, pharmaceuticals, and communications equipment) gained world market share in the 1990s. The aerospace industry was the only U.S. high-technology industry to lose market share from 1990 to 1998.
- ◆ **Technology products account for a larger share of U.S. exports than imports, thereby making a positive contribution to the U.S. overall balance of trade.** A trend of declining trade surpluses in technology products reversed after several years during the mid-1990s. Between 1990 and 1995, trade in aerospace technologies consistently produced large—albeit declining—trade surpluses for the United States. Since then, U.S. exports of aerospace technologies, electronics, biotechnologies, and software have outpaced imports, leading to increasing trade surpluses in 1996 and 1997 before narrowing slightly in 1998 and 1999.
- ◆ **The United States is also a net exporter of technological know-how sold as intellectual property.** Royalties and fees received from foreign firms have been, on average, three times greater than those paid out to foreigners by U.S. firms for access to their technology. U.S. receipts from licensing of technological know-how to foreigners plateaued at about \$3.5 billion between 1996 and 1998. Japan is the largest consumer of U.S. technology sold as intellectual property; South Korea is a distant second. Together, Japan and South Korea accounted for more than 44 percent of total receipts in 1999.

New High-Technology Exporters

- ◆ **When a model of leading indicators is applied, Ireland and Israel appear to be headed toward prominence as technology developers and exporters to global markets.** Ireland led the group of 15 small or less-advanced countries examined in three of four leading indicators and received the second highest score in the fourth, technological infrastructure. On that indicator, Israel ranked first because of its large number of trained scientists and engineers, highly regarded research enterprise, and contribution to scientific knowledge. Hungary and India also posted strong scores on at least three of the four indicators.

International Trends in Industrial Research and Development

- ◆ **Internationally comparable data show the importance of service-sector research and development (R&D) in several industrialized countries.** In 1997, service-sector industries, such as those involved in communications or computer software development, accounted for 20 percent of all R&D performed by industry in the United States and in the United Kingdom, 15 percent in Italy, and 10 percent in France. Although it has increased in recent years, service-sector R&D still accounted for only about 5 percent of all R&D performed by industry in Germany and in Japan.
- ◆ **In most industrialized countries, the aerospace, motor vehicle, electronic equipment, and pharmaceutical industries conduct the largest amounts of R&D.** In the United States, industries making computer hardware, electronics, and motor vehicles led the nation in R&D. Japan's electronic equipment industry was the leading performer of R&D throughout the period reviewed, followed by its motor vehicle industry. Manufacturers of electronics equipment, motor vehicles, and industrial chemicals have consistently been among the top five performers of R&D in the European Union.

Patented Inventions

- ◆ **In 1999, more than 153,000 patents were issued in the United States, 4 percent more than were granted a year earlier.** This record number of new inventions, resulting in new patents, caps off nearly a decade of year-to-year growth during the 1990s. The proportion of all new patents granted to U.S. inventors has generally risen since the late 1980s, reaching 55 percent in 1999.
- ◆ **Foreign patenting in the United States continues to be highly concentrated by country of origin.** In 1999, Japan and Germany accounted for slightly more than 58 percent of foreign-origin U.S. patents, and the top four countries, Japan, Germany, France, and the United Kingdom, accounted for 70 percent. Both South Korea and Taiwan dramatically increased their U.S. patent activity in the late 1980s, and in 1999, each was awarded more U.S. patents than Canada, historically one of the top five nations patenting in the United States.
- ◆ **Recent U.S. patents by foreign inventors emphasize several commercially important technologies.** Japanese patents focus on consumer electronics, photography, photocopying, and, more recently, computer technology. German inventors are developing new products and processes associated with heavy industry, such as motor vehicles, printing, advanced materials, and manufacturing technologies. Inventors from Taiwan and South Korea are earning an increasing number of U.S. patents in communications and computer technology.

Venture Capital and High-Technology Enterprise

- ♦ **The amount of money managed by venture capital firms grew dramatically during the 1980s as venture capital emerged as an important source of financing for small, innovative firms.** In the early 1990s, the venture capital industry slowed as investor interest waned and the amount of venture capital disbursed declined. But this slowdown was short lived: investor interest picked up in 1992, and disbursements began to rise again in 1993. Both investor interest and venture capital disbursements continued to grow through 2000.
- ♦ **Internet companies attracted more venture capital than any other technology area.** In 2000, venture capital firms disbursed nearly \$90.6 billion, of which more than 45 percent went to Internet firms. Telecommunications companies were second with nearly 17 percent, and companies developing computer software or delivering software services were third with just more than 14 percent.
- ♦ **Little venture capital is used as seed money.** During the past 10 years, money given to entrepreneurs to prove a concept or to support early product development never accounted for more than 6 percent of total venture capital disbursements and most often represented only 2 to 4 percent of the annual totals. In 2000, seed money accounted for just 1.4 percent of all venture capital disbursements, whereas money for company expansion was about 61 percent.